

FIG.1

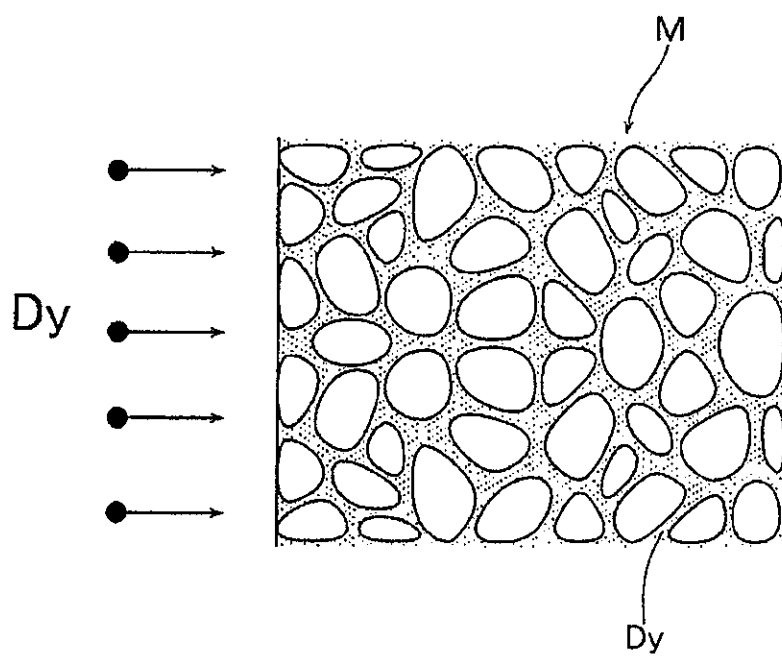


FIG.2

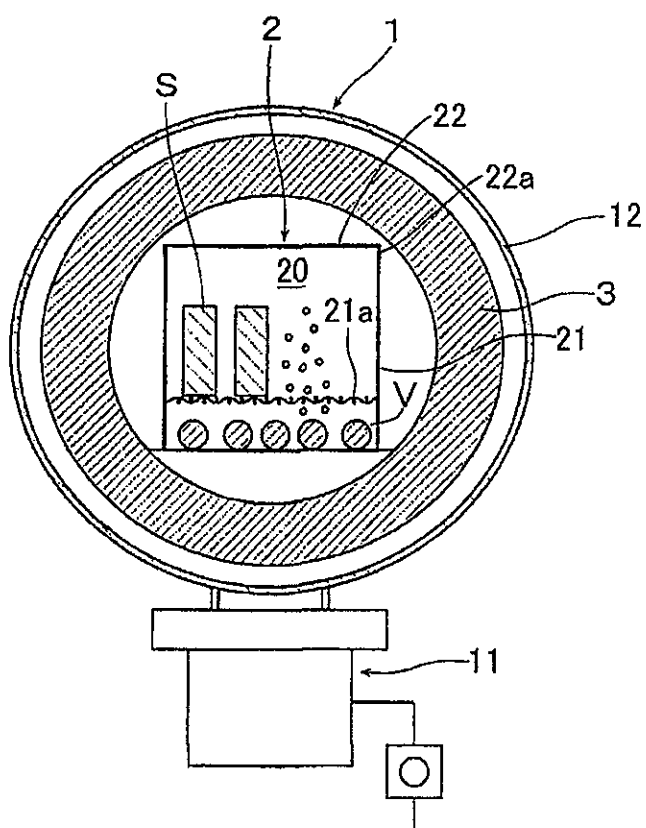


FIG.3

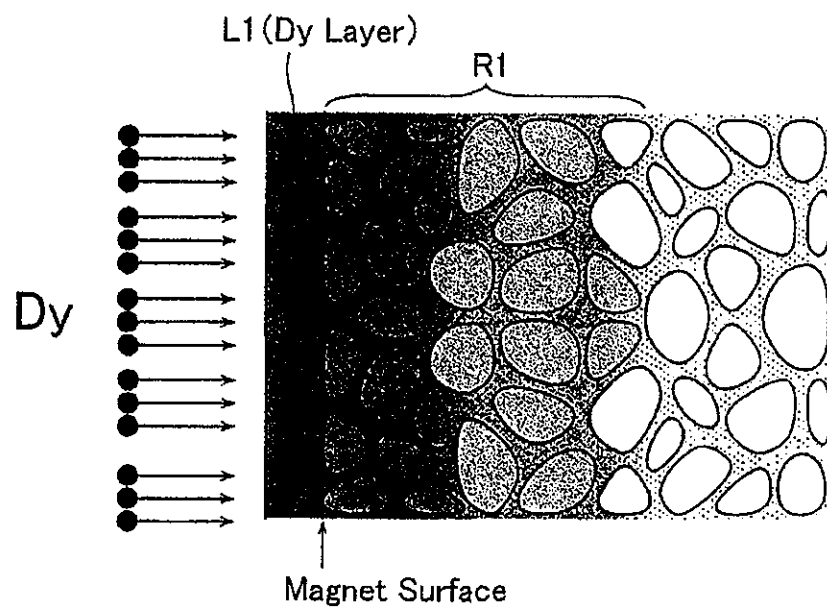


FIG.4A

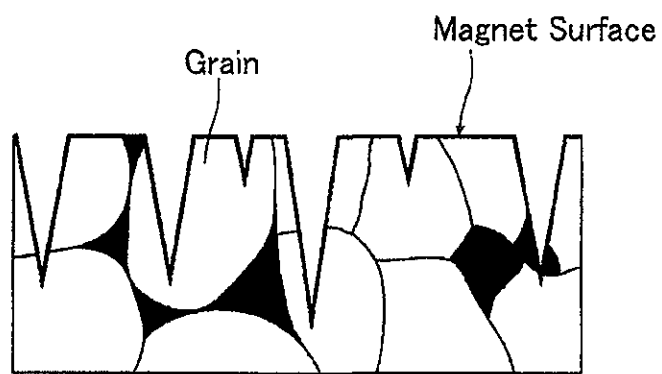


FIG.4B

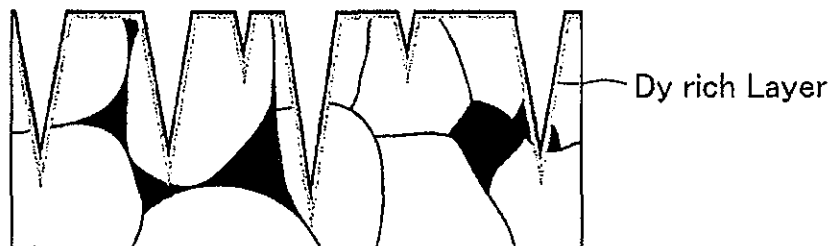


FIG.5

|                        | Evaporating source | Vapor Processing Time(h) | Br(kG) | iHc(k0e) | (BH)max(MG0e) | (BH)max+iHc |
|------------------------|--------------------|--------------------------|--------|----------|---------------|-------------|
| Comparative Example 1a | No                 | 0                        | 13.6   | 15.8     | 44.7          | 60.5        |
|                        | Dy                 | 1                        | 13.6   | 18.9     | 45.1          | 64.0        |
|                        | Dy                 | 10                       | 13.6   | 21.5     | 45.0          | 66.5        |
|                        | Dy                 | 18                       | 13.6   | 24.3     | 44.7          | 69.0        |
| Example 1a             | DyF <sub>3</sub>   | 1                        | 13.6   | 20.9     | 45.0          | 65.9        |
|                        | DyF <sub>3</sub>   | 10                       | 13.6   | 24.2     | 45.1          | 69.3        |
|                        | DyF <sub>3</sub>   | 18                       | 13.6   | 24.1     | 45.0          | 69.1        |

FIG.6

|                        | Evaporating source | Vapor Processing Time(h) | Br(kG) | iHc(k0e) | (BH)max(MG0e) | (BH)max+iHc |
|------------------------|--------------------|--------------------------|--------|----------|---------------|-------------|
| Comparative Example 1b | No                 | 0                        | 13.6   | 15.8     | 44.7          | 60.5        |
|                        | Tb                 | 1                        | 13.6   | 20.9     | 45.2          | 66.1        |
|                        | Tb                 | 10                       | 13.7   | 25.1     | 45.0          | 70.1        |
|                        | Tb                 | 18                       | 13.7   | 28.3     | 45.1          | 73.4        |
| Example 1b             | TbF3               | 1                        | 13.6   | 25.3     | 45.1          | 70.4        |
|                        | TbF3               | 10                       | 13.6   | 28.2     | 45.0          | 73.2        |
|                        | TbF3               | 18                       | 13.7   | 28.3     | 45.1          | 73.4        |

FIG.7

|                        | Evaporating source                      | Br(kG) | iHc(kOe) | (BH) <sub>max</sub> (MG0e) | (BH) <sub>max</sub> +iHc |
|------------------------|-----------------------------------------|--------|----------|----------------------------|--------------------------|
| Comparative Example 2b | DyF <sub>3</sub>                        | 13.6   | 24.2     | 45.1                       | 69.3                     |
| Comparative Example 2a | DyF <sub>3</sub>                        | 13.6   | 21.6     | 45.1                       | 66.7                     |
| Example 2a             | 90 DyF <sub>3</sub> 10 NdF <sub>3</sub> | 13.6   | 26.1     | 45.2                       | 71.3                     |
|                        | 80 DyF <sub>3</sub> 20 NdF <sub>3</sub> | 13.7   | 26.5     | 45.2                       | 71.7                     |
|                        | 70 DyF <sub>3</sub> 30 NdF <sub>3</sub> | 13.7   | 26.7     | 45.3                       | 72.0                     |
|                        | 60 DyF <sub>3</sub> 40 NdF <sub>3</sub> | 13.8   | 26.8     | 46.0                       | 72.8                     |
|                        | 50 DyF <sub>3</sub> 50 NdF <sub>3</sub> | 13.8   | 26.8     | 46.2                       | 73.0                     |
|                        | 40 DyF <sub>3</sub> 60 NdF <sub>3</sub> | 13.8   | 26.9     | 46.3                       | 73.2                     |
|                        | 30 DyF <sub>3</sub> 70 NdF <sub>3</sub> | 13.8   | 26.9     | 46.3                       | 73.2                     |
|                        | 20 DyF <sub>3</sub> 80 NdF <sub>3</sub> | 13.9   | 27.2     | 46.5                       | 73.7                     |
|                        | 10 DyF <sub>3</sub> 90 NdF <sub>3</sub> | 14.0   | 27.8     | 47.3                       | 75.1                     |
|                        | 1 DyF <sub>3</sub> 99 NdF <sub>3</sub>  | 13.9   | 26.8     | 46.7                       | 73.5                     |
|                        | 50 DyF <sub>3</sub> 50 PrF <sub>3</sub> | 13.8   | 27.5     | 46.7                       | 74.2                     |

FIG.8

|                        | Evaporating source                      | Br(kG) | iHc(kOe) | (BH) <sub>max</sub> (MG0e) | (BH) <sub>max</sub> +iHc |
|------------------------|-----------------------------------------|--------|----------|----------------------------|--------------------------|
| Comparative Example 2d | TbF <sub>3</sub>                        | 13.6   | 28.2     | 45.0                       | 73.2                     |
| Comparative Example 2c | TbF <sub>3</sub>                        | 13.6   | 28.2     | 45.0                       | 73.2                     |
| Example 2b             | 90 TbF <sub>3</sub> 10 NdF <sub>3</sub> | 13.6   | 32.1     | 45.1                       | 77.2                     |
|                        | 80 TbF <sub>3</sub> 20 NdF <sub>3</sub> | 13.7   | 32.5     | 45.1                       | 77.6                     |
|                        | 70 TbF <sub>3</sub> 30 NdF <sub>3</sub> | 13.7   | 32.6     | 45.2                       | 77.8                     |
|                        | 60 TbF <sub>3</sub> 40 NdF <sub>3</sub> | 13.7   | 32.8     | 45.9                       | 78.7                     |
|                        | 50 TbF <sub>3</sub> 50 NdF <sub>3</sub> | 13.8   | 33.9     | 46.1                       | 80.0                     |
|                        | 40 TbF <sub>3</sub> 60 NdF <sub>3</sub> | 13.8   | 34.2     | 46.2                       | 80.4                     |
|                        | 30 TbF <sub>3</sub> 70 NdF <sub>3</sub> | 13.9   | 34.7     | 46.2                       | 80.9                     |
|                        | 20 TbF <sub>3</sub> 80 NdF <sub>3</sub> | 13.9   | 35.6     | 46.4                       | 82.0                     |
|                        | 10 TbF <sub>3</sub> 90 NdF <sub>3</sub> | 14.0   | 36.3     | 47.2                       | 83.5                     |
|                        | 1 TbF <sub>3</sub> 99 NdF <sub>3</sub>  | 13.9   | 34.3     | 46.6                       | 80.9                     |
|                        | 50 TbF <sub>3</sub> 50 PrF <sub>3</sub> | 13.8   | 35.7     | 46.6                       | 82.3                     |

FIG.9

Evaporating source 90DyF310A

|                        | Element A | Mixing Ratio(wt%) | Br(kG) | iHc(kOe) | (BH) <sub>max</sub> (MG0e) | (BH) <sub>max</sub> +iHc |
|------------------------|-----------|-------------------|--------|----------|----------------------------|--------------------------|
| Comparative Example 2d | No        | No                | 13.6   | 24.2     | 45.1                       | 69.3                     |
| Example 3a             | Al        | 50                | 13.7   | 29.2     | 45.7                       | 74.9                     |
|                        | Ag        | 50                | 13.7   | 27.3     | 45.3                       | 72.6                     |
|                        | B         | 50                | 13.8   | 26.8     | 45.1                       | 71.9                     |
|                        | Ba        | 50                | 13.8   | 26.7     | 45.5                       | 72.2                     |
|                        | Be        | 50                | 13.7   | 27.2     | 45.1                       | 72.3                     |
|                        | C         | 50                | 13.8   | 26.8     | 46.0                       | 72.8                     |
|                        | Cu        | 50                | 13.7   | 29.3     | 45.6                       | 74.9                     |
|                        | Ca        | 50                | 13.7   | 26.9     | 45.1                       | 71.9                     |
|                        | Ce        | 50                | 13.7   | 27.3     | 45.1                       | 72.4                     |
|                        | Co        | 50                | 13.7   | 26.9     | 45.2                       | 72.1                     |
|                        | Cr        | 50                | 13.8   | 26.6     | 45.7                       | 72.2                     |
|                        | Cs        | 50                | 13.8   | 26.8     | 45.8                       | 72.5                     |
|                        | Dy        | 50                | 13.8   | 26.5     | 46.0                       | 72.4                     |
|                        | Er        | 50                | 13.8   | 26.4     | 45.4                       | 71.8                     |
|                        | Eu        | 50                | 13.8   | 26.7     | 45.6                       | 72.3                     |
|                        | Fe        | 50                | 13.7   | 26.8     | 45.4                       | 72.3                     |
|                        | Ga        | 1                 | 13.7   | 29.0     | 45.5                       | 74.5                     |
|                        | Gd        | 50                | 13.8   | 26.8     | 45.1                       | 71.9                     |
|                        | Ge        | 50                | 13.8   | 26.6     | 45.7                       | 72.3                     |
|                        | Hf        | 50                | 13.8   | 26.8     | 45.6                       | 72.4                     |
|                        | Ho        | 50                | 13.8   | 26.7     | 45.9                       | 72.8                     |
|                        | In        | 50                | 13.8   | 26.5     | 45.5                       | 71.9                     |
|                        | K         | 50                | 13.7   | 27.3     | 45.9                       | 73.2                     |
|                        | La        | 50                | 13.7   | 27.1     | 45.2                       | 72.4                     |
|                        | Li        | 50                | 13.8   | 26.7     | 45.7                       | 72.5                     |
|                        | Lu        | 50                | 13.7   | 26.9     | 45.1                       | 72.0                     |
|                        | Mg        | 50                | 13.7   | 26.9     | 45.6                       | 72.5                     |
|                        | Mn        | 50                | 13.7   | 27.1     | 45.5                       | 72.6                     |
|                        | Mo        | 50                | 13.7   | 26.8     | 45.4                       | 72.2                     |
|                        | Na        | 50                | 13.7   | 26.9     | 45.2                       | 72.2                     |
|                        | Nb        | 50                | 13.7   | 27.1     | 45.3                       | 72.4                     |
|                        | Nd        | 50                | 13.8   | 28.1     | 46.0                       | 74.1                     |
|                        | Ni        | 50                | 13.7   | 26.9     | 45.2                       | 72.0                     |
|                        | P         | 50                | 13.8   | 26.7     | 45.5                       | 72.2                     |
|                        | Pd        | 50                | 13.7   | 26.6     | 45.2                       | 72.0                     |
|                        | Pr        | 50                | 13.7   | 28.9     | 45.4                       | 74.3                     |
|                        | Ru        | 50                | 13.7   | 27.3     | 45.2                       | 72.4                     |
|                        | S         | 50                | 13.8   | 26.4     | 45.7                       | 72.0                     |
|                        | Sb        | 50                | 13.7   | 27.0     | 45.0                       | 72.1                     |
|                        | Si        | 50                | 13.7   | 26.9     | 45.3                       | 72.2                     |
|                        | Sm        | 50                | 13.8   | 26.4     | 45.5                       | 72.0                     |
|                        | Sn        | 50                | 13.7   | 26.8     | 46.0                       | 72.8                     |
|                        | Sr        | 50                | 13.8   | 26.4     | 45.4                       | 71.8                     |
|                        | Ta        | 50                | 13.8   | 26.4     | 45.2                       | 71.6                     |
|                        | Tb        | 50                | 13.8   | 28.6     | 45.7                       | 74.4                     |
|                        | Ti        | 50                | 13.7   | 26.8     | 45.7                       | 72.5                     |
|                        | Tm        | 50                | 13.7   | 26.5     | 45.1                       | 71.6                     |
|                        | V         | 50                | 13.7   | 26.9     | 45.1                       | 72.0                     |
|                        | W         | 50                | 13.8   | 26.6     | 45.4                       | 72.0                     |
|                        | Y         | 50                | 13.7   | 27.2     | 45.6                       | 72.8                     |
|                        | Yb        | 50                | 13.8   | 26.5     | 45.6                       | 72.1                     |
|                        | Zn        | 50                | 13.7   | 27.2     | 45.7                       | 72.9                     |
|                        | Zr        | 50                | 13.7   | 27.1     | 45.1                       | 72.2                     |

FIG.10

Evaporating source90TbF310A

|                        | Element A | Mixing Ratio(wt%) | Br(kG) | iHc(kOe) | (BH) <sub>max</sub> (MG0e) | (BH) <sub>max</sub> +iHc |
|------------------------|-----------|-------------------|--------|----------|----------------------------|--------------------------|
| Comparative Example 2d | No        | No                | 13.6   | 28.2     | 45.0                       | 73.2                     |
| Example 3a             | Al        | 50                | 13.8   | 31.4     | 45.0                       | 76.5                     |
|                        | Ag        | 50                | 13.8   | 29.8     | 45.5                       | 75.3                     |
|                        | B         | 50                | 13.7   | 30.0     | 46.0                       | 76.0                     |
|                        | Ba        | 50                | 13.8   | 29.6     | 45.3                       | 74.9                     |
|                        | Be        | 50                | 13.8   | 29.4     | 45.5                       | 74.9                     |
|                        | C         | 50                | 13.8   | 29.6     | 45.3                       | 74.9                     |
|                        | Cu        | 50                | 13.7   | 31.6     | 45.4                       | 77.0                     |
|                        | Ca        | 50                | 13.7   | 30.3     | 45.2                       | 75.4                     |
|                        | Ce        | 50                | 13.8   | 29.5     | 45.6                       | 75.1                     |
|                        | Co        | 50                | 13.7   | 30.0     | 45.4                       | 75.4                     |
|                        | Cr        | 50                | 13.7   | 30.3     | 45.2                       | 75.5                     |
|                        | Cs        | 50                | 13.7   | 30.1     | 46.0                       | 76.0                     |
|                        | Dy        | 50                | 13.7   | 32.0     | 45.8                       | 77.8                     |
|                        | Er        | 50                | 13.7   | 30.3     | 45.2                       | 75.6                     |
|                        | Eu        | 50                | 13.7   | 30.3     | 45.5                       | 75.8                     |
|                        | Fe        | 50                | 13.7   | 30.1     | 45.7                       | 75.8                     |
|                        | Ga        | 1                 | 13.8   | 31.2     | 45.5                       | 76.8                     |
|                        | Gd        | 50                | 13.8   | 29.7     | 45.3                       | 75.0                     |
|                        | Ge        | 50                | 13.7   | 30.0     | 45.0                       | 75.0                     |
|                        | Hf        | 50                | 13.8   | 29.6     | 45.8                       | 75.4                     |
|                        | Ho        | 50                | 13.8   | 29.6     | 45.8                       | 75.4                     |
|                        | In        | 50                | 13.8   | 29.4     | 45.1                       | 74.5                     |
|                        | K         | 50                | 13.8   | 29.7     | 46.0                       | 75.7                     |
|                        | La        | 50                | 13.7   | 30.2     | 45.9                       | 76.1                     |
|                        | Li        | 50                | 13.8   | 29.5     | 45.8                       | 75.4                     |
|                        | Lu        | 50                | 13.7   | 30.1     | 45.2                       | 75.3                     |
|                        | Mg        | 50                | 13.7   | 30.3     | 45.2                       | 75.4                     |
|                        | Mn        | 50                | 13.7   | 30.1     | 45.6                       | 75.7                     |
|                        | Mo        | 50                | 13.8   | 29.6     | 45.7                       | 75.2                     |
|                        | Na        | 50                | 13.7   | 30.2     | 45.1                       | 75.3                     |
|                        | Nb        | 50                | 13.8   | 29.6     | 45.8                       | 75.4                     |
|                        | Nd        | 50                | 13.7   | 32.1     | 45.6                       | 77.7                     |
|                        | Ni        | 50                | 13.7   | 30.1     | 45.3                       | 75.3                     |
|                        | P         | 50                | 13.7   | 30.2     | 45.4                       | 75.6                     |
|                        | Pd        | 50                | 13.8   | 29.9     | 46.0                       | 75.9                     |
|                        | Pr        | 50                | 13.7   | 32.1     | 46.0                       | 78.1                     |
|                        | Ru        | 50                | 13.7   | 30.1     | 45.6                       | 75.7                     |
|                        | S         | 50                | 13.7   | 30.0     | 45.5                       | 75.6                     |
|                        | Sb        | 50                | 13.8   | 29.7     | 45.9                       | 75.7                     |
|                        | Si        | 50                | 13.8   | 29.6     | 45.1                       | 74.7                     |
|                        | Sm        | 50                | 13.8   | 29.8     | 45.9                       | 75.7                     |
|                        | Sn        | 50                | 13.8   | 29.7     | 45.6                       | 75.2                     |
|                        | Sr        | 50                | 13.7   | 30.2     | 45.8                       | 76.0                     |
|                        | Ta        | 50                | 13.7   | 30.4     | 45.1                       | 75.5                     |
|                        | Tb        | 50                | 13.7   | 33.0     | 45.3                       | 78.3                     |
|                        | Ti        | 50                | 13.7   | 29.9     | 45.4                       | 75.3                     |
|                        | Tm        | 50                | 13.8   | 29.8     | 45.8                       | 75.6                     |
|                        | V         | 50                | 13.7   | 30.2     | 45.8                       | 76.0                     |
|                        | W         | 50                | 13.7   | 30.3     | 45.9                       | 76.2                     |
|                        | Y         | 50                | 13.8   | 29.8     | 45.9                       | 75.6                     |
|                        | Yb        | 50                | 13.8   | 29.7     | 45.9                       | 75.6                     |
|                        | Zn        | 50                | 13.7   | 30.0     | 45.7                       | 75.6                     |
|                        | Zr        | 50                | 13.8   | 29.8     | 45.4                       | 75.2                     |

FIG.11

|                                  | Br(kG) | iHc(kOe) | (BH)<br>max(MGOe) | (BH)<br>max+iHc |
|----------------------------------|--------|----------|-------------------|-----------------|
| Block                            | 14.4   | 10.5     | 51.4              | 61.9            |
| Cutting Without Vapor Processing | 14.4   | 9.3      | 43.3              | 52.6            |
| Block After Vapor Processing     | 14.4   | 18.3     | 51.2              | 69.5            |
| Cutting After Vapor Processing   | 14.4   | 18.2     | 48.8              | 67.0            |